

2001 Defense Standardization Program Award



Joint Tactical Radio System (JTRS)



**JTRS Briefing to
Industry
26 February
2004**



**<http://jtrs.army.mil>
703-588-1056**

**JTRS
Joint Program
Office**

**Col Steven A. MacLaird,
USAF
Program Director
COL Glen D. Lambkin,**



JTRS Evolution

- The Program
- Changing JTRS Requirements
 - Developing CONOPs
 - OSD Policy
 - Additional Requirements
 - Networking Requirements
 - Security Requirements

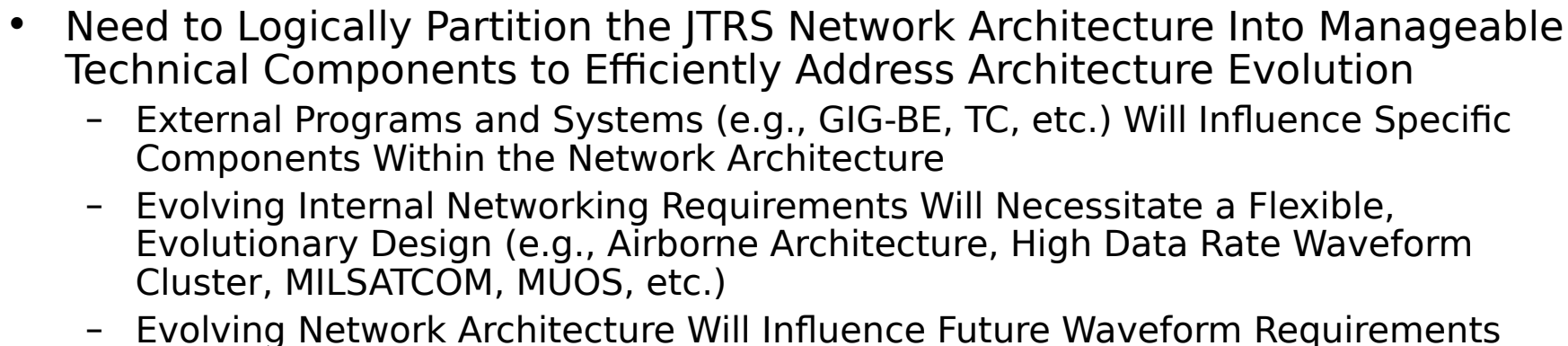
Networking Architecture Strategy

- Evolutionary Acquisition Strategy
 - IPv6
 - >2GHz
- Notional Timelines
- Critical Technology



JTRS Networking Architecture Strategy

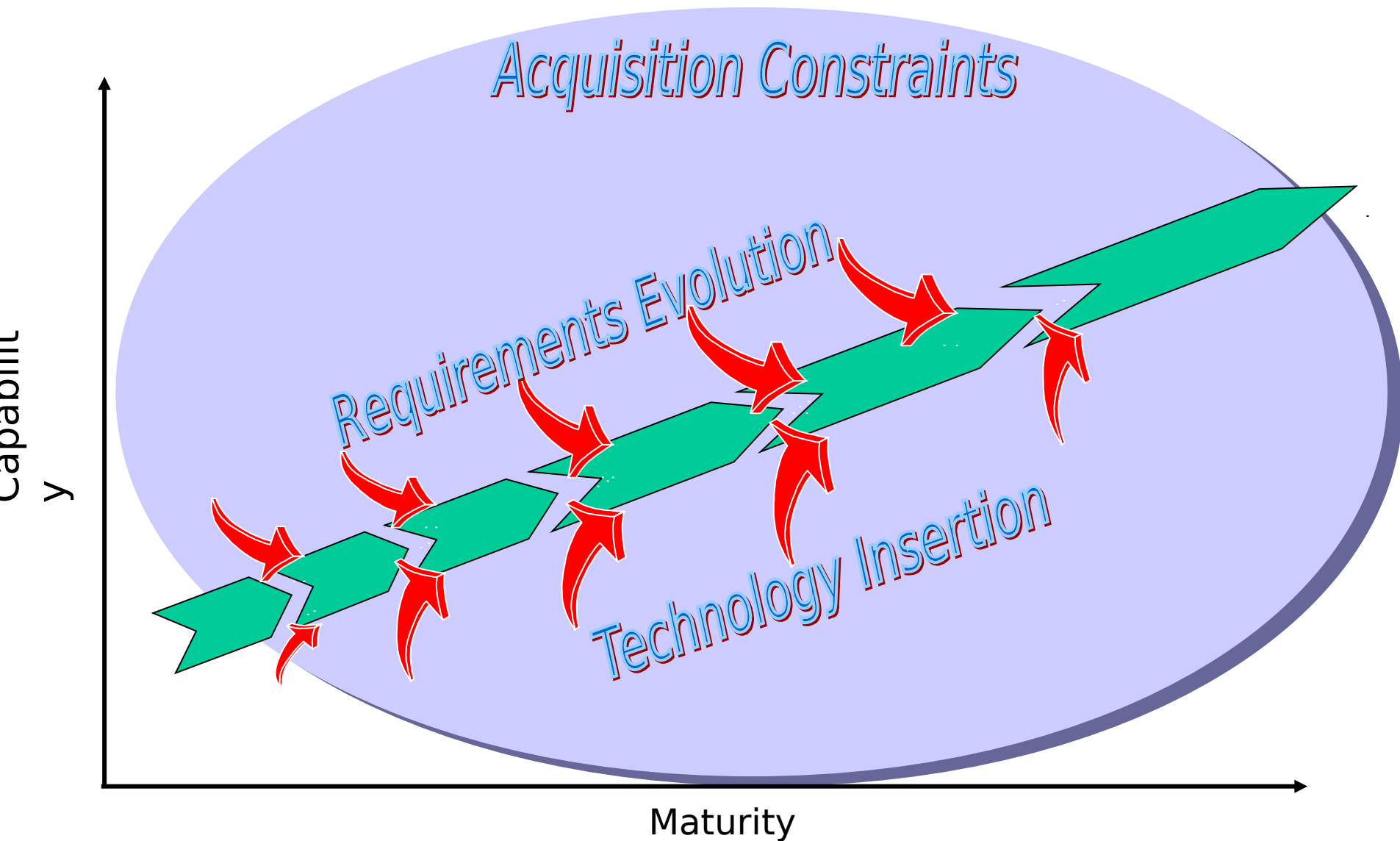
- JTRS Networking Architecture Includes
 - Common Set of JTRS Networking Services
 - Multiple Wireless Physical Layers
 - End to End Security Approach
 - End to End Services
- JTRS Networking Architecture Strategy Is Intended to Be an Evolutionary Strategy
 - JTRS WNW Development Is the Initial Component
 - Other Components Are Necessary to Achieve the Goals
- Strategy Requires a Standards Based, “Open”, Nonproprietary Based Networking Architecture
- Acquisition Approach Includes Third Party Vendors Building Compatible Components That Can Be Easily Integrated As Part of the JTRS Networking Architecture





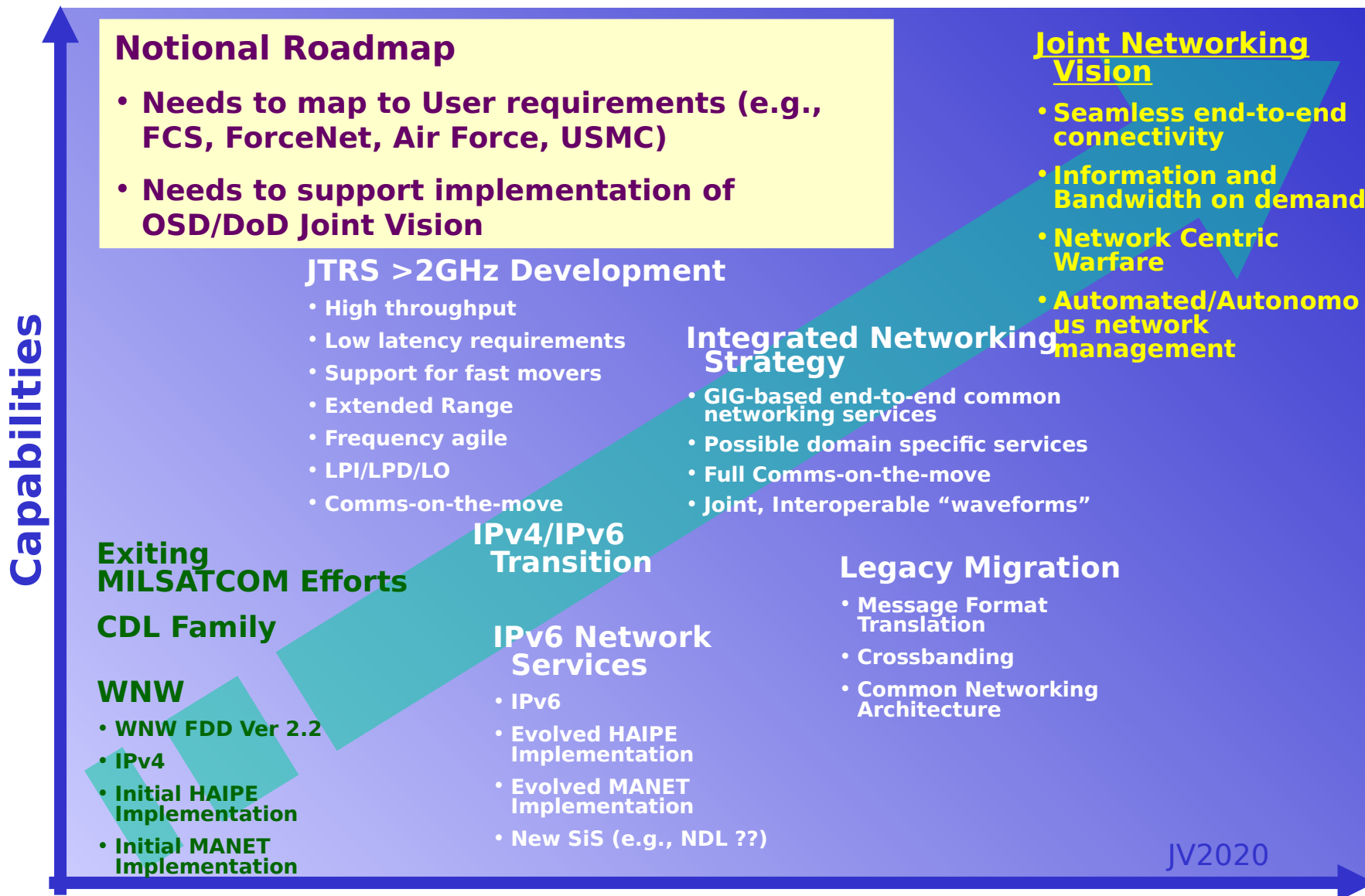
JTRS Evolution

A Growth Execution Strategy





Achieving the JTRS Vision Requires a Consolidated Approach





JTRS IPv6 Transition Strategy

- JTRS JPO Responsible for JTRS IPv6 Network Transition for the JTRS Program
- JTRS JPO Developing IPv6 Transition Plan for All JTRS Activities
 - In Accordance With DoD CIO IPv6 Transition Plan
 - Coordinated With Each Service Plan
- JPO in Concert With the JTRS Networking IPT (JNIPT) Working to Define a JTRS Networking Architecture Evolution Strategy
 - Ongoing Industry Government Exchange
 - JTRS Networking Reference Architecture and Services Definition

JTRS JPO Not Responsible for the Upgrade of Legacy (Non-JTRS) Implementations of Waveforms, Networks or Systems



JTRS IPv6 Acquisition Strategy

- JTRS JPO Planning to Conduct a Full and Open Competition for the Development of JTRS IPv6 Capable **Networking Services** to Include
 - Updated HAIPE Requirements
 - Updated Network Management Services
 - Modeling and Simulation
 - Test and Evaluation
- JTRS JPO IPv6 Networking Insertion Into Existing and Future JTRS Acquisitions at Appropriate Time During Their Development
 - To Support Service Transition Plans
 - To Support GIG Transition Strategy
 - To Minimize Duplication of Development Efforts



What JTRS Means to the >2GHz Community

- Software Based Portable Waveforms
 - Interoperability
 - Upgradeability
- Consolidated Approach to >2GHz Terminal Capabilities
 - Migrate Legacy Terminal Acquisitions into Programmable JTRS Solutions
 - Common Modules - Where Applicable
 - Technology Insertion
- Integral Part of JTRS Networking Architecture
 - Common Networking Services
 - Integration into the GIG



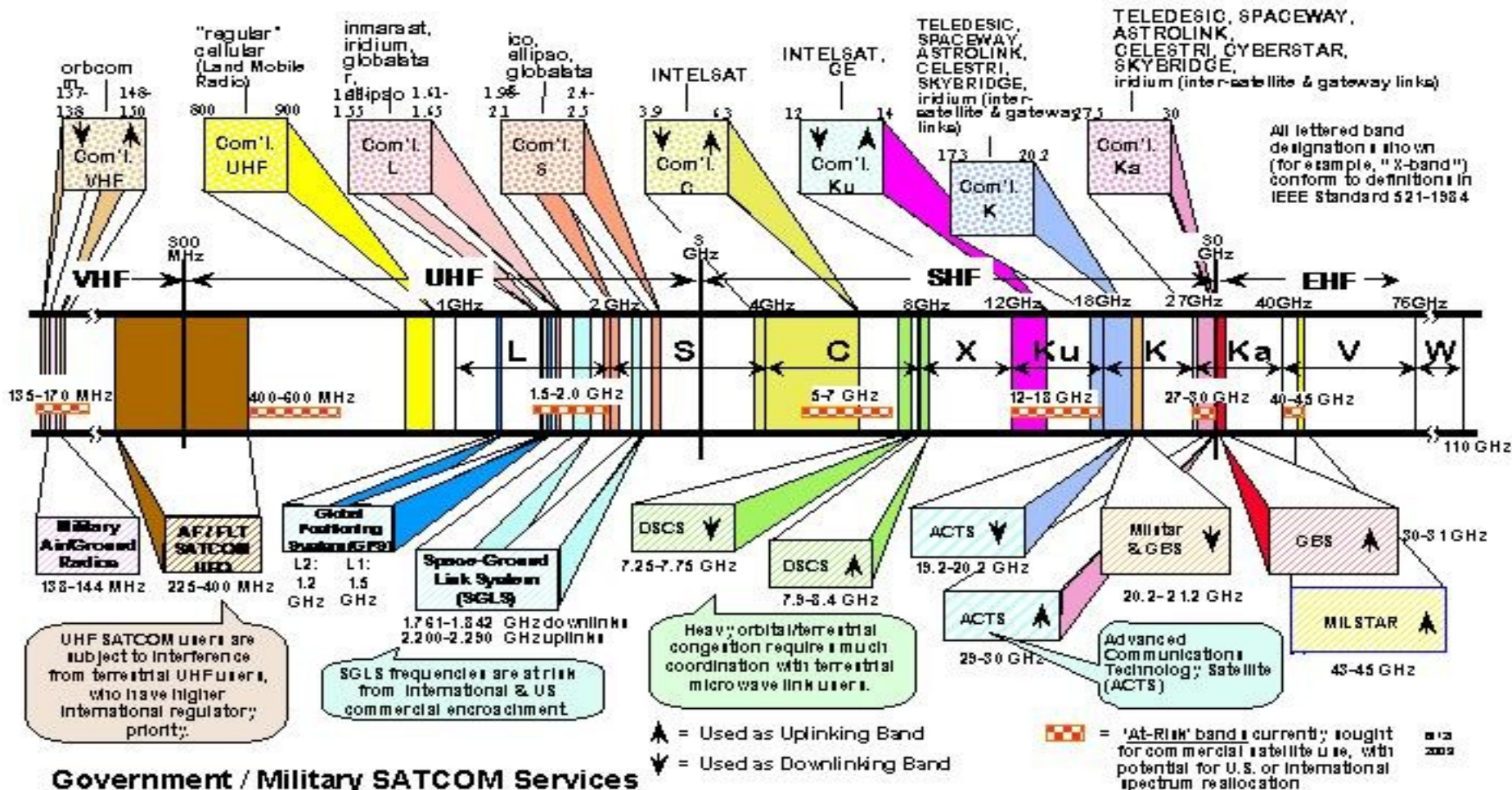
The Expanded JTRS Frequency Spectrum

LEGEND: (Commercial SATCOM)

CAPITALIZED NAMES = Fixed Satellite Service (FSS)

lowercase names = Mobile Satellite Service (MSS)/Personal Comm Services (PCS)

Commercial SATCOM Services





The MILSATCOM and Datalink Waveforms

Protected

Purpose	Waveform Designation	Modulation	MA scheme	Data Rate (Mb/s)	Frequency Bands (GHz)	MILSATCOM System
<ul style="list-style-type: none"> Provides assured and survivable communications for strategic military operations Resists jamming and nuclear scintillation 	LDR	FSK, DPSK	FH-FDM/TDMA	<< 0.1	44 (uplink) 20 (downlink)	Milstar, UFO-E & AEHF
	MDR	DPSK	FH-FDM/TDM	< 1.5		AEHF & T-SAT
	XDR	FSK, DPSK, GMSK	FH-FDM/TDMA	< 8		
	XDR+	TBD	FH-FDM/TDMA	< 45		T-SAT & APS

Wideband

<ul style="list-style-type: none"> Supports entire spectrum of tactical military operations from major theater war to humanitarian assistance 	X-band waveforms	BPSK, (O)QPSK & 8-PSK	FDMA, SSMA	< 20	8 (uplink) 7 (downlink)	DSCS & WGS
	Ka-band waveforms	BPSK, (O)QPSK, 8-PSK & 16-QAM	FDMA	< 155	30 (uplink) 20 (downlink)	WGS
	Ka- and Ku band waveforms	QPSK	Broadcast	12 - 48	30/14 (uplink) 20/12 (downlink)	GBS (rcv only on UFO 8, 9, 10)/ multiple comm'l
	Commercial transponded	n-PSK	FDMA	Varies	L, S, C, Ku	Varies

Laser

<ul style="list-style-type: none"> Backbone connectivity for TC High band video and imagery data 	Laser	TBD	TBD	> 1,000	Optical	T-SAT
--	-------	-----	-----	---------	---------	-------

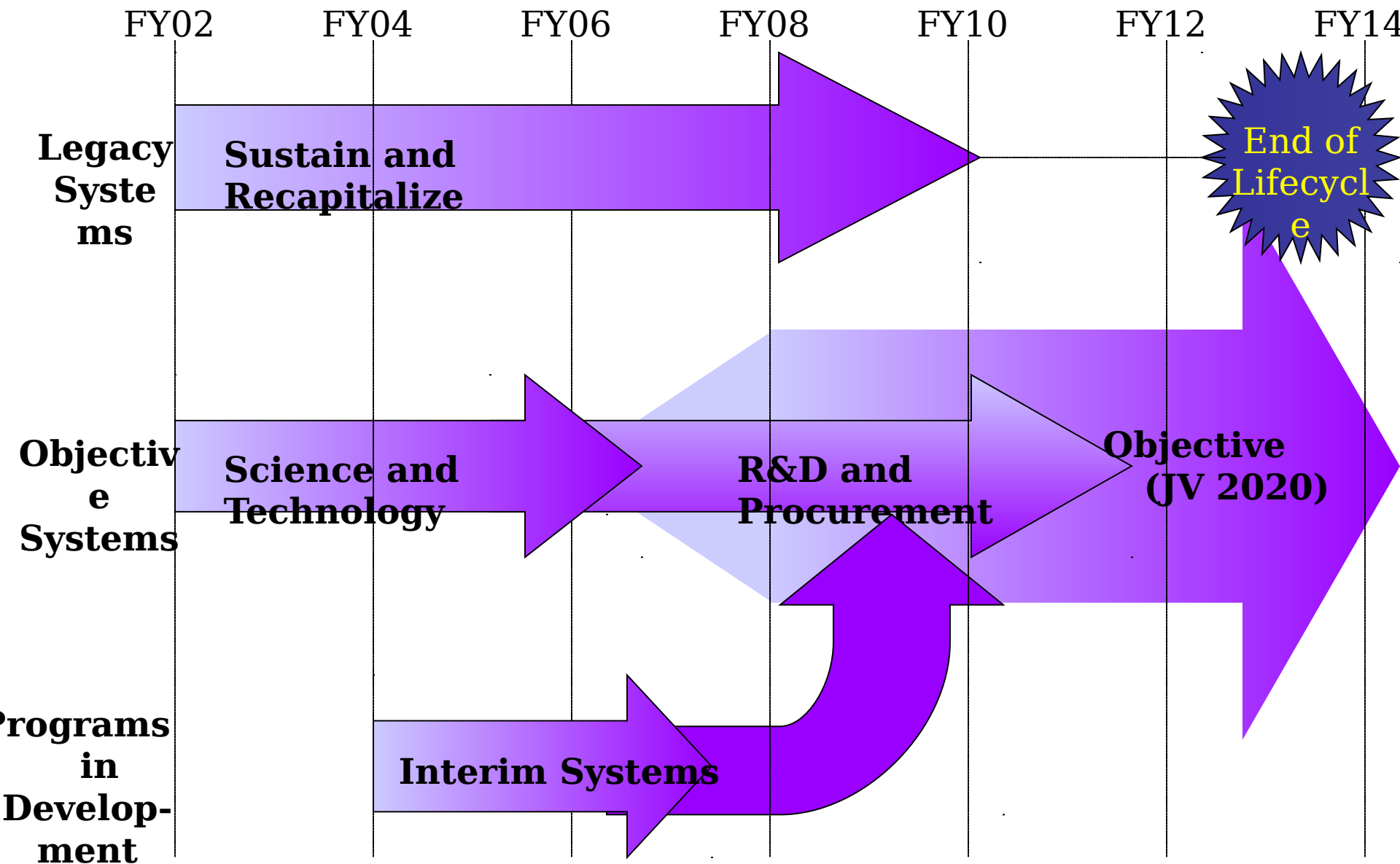
Datalink

<ul style="list-style-type: none"> High band video and imagery data Primarily supported ISR community, but capability is being pushed to all platforms on the battlefield 	Std-CDL	BPSK, (O)QPSK	FDMA	<10.71FL <274RL	X, Ku, Ka, EHF	LOS
	Adv-CDL	BPSK, (O)QPSK	FDMA	<274		
	Net-CDL	BPSK, QPSK	FDMA	<137 OL <67 RL		
	SE-CDL	BPSK, QSPK, (O)QSPK, 8PSK, 16QAM	FH-FDM/TDMA	<274-548		T-SAT & APS

FL=Forward Link RL=Return Link



JTRS >2GHz Migration Concept



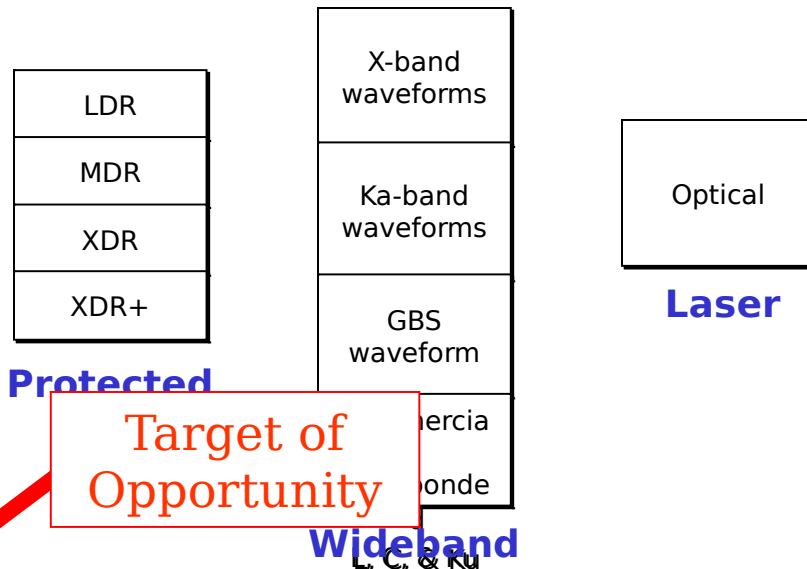


>2GHz MILSATCOM Waveform Developments and Opportunities...

Current Waveforms:

***SINGARS**
***HAVEQUICK II**
***WNW**
***EPLRS**
***DAMA SATCOM**
181/182/183
***Link 16**
DAMA SATCOM 184
HF ISB w/ALE
HF SSB w/ALE
VHF ATC Data Link (8.33)
VHF ATC Data Link (25Khz)
STANAG 5066 (HF)
STANAG 4529 (HF)
HF ATC Data Link
SATURN
UHF AM/FM PSK LOS
VHF AM/FM (2 Wfs)
Link 4/4A (TADIL C)
Link 11 (TADIL A)
Link 11B (TADIL B)
VHF/ UHF FM Public Service (LMR)
COBRA
STANAG 4193 Mode S Level 4/5
Soldier Radio
IBS-M
Digital Wideband Transmission System
MUOS (ANSCAI)
Cellular radio & PCS
BOWMAN VHF
Link 22/NILE
VHF ATC Data Link (NEXCOM)
BOWMAN UHF/HF
Mobile Satellite Service (MSS)

Potential SATCOM Waveforms:



There are multiple MILSATCOM Waveforms under development, but may not be portable (SCA Compliant). Need help from industry to assist in determining what waveform functions will be in software and which will remain in hardware.

Need to develop commercial waveforms (C, Ku, and INMARSAT) that are SCA compliant.

Centralized Management of Waveforms:
Partnership between MJPO and JTRS JPO in development and testing of SATCOM waveforms:
JTEO SME on MILSATCOM waveforms
JTRS JPO SME on JTRS and SCA
Co-Chair effort in RFP/Source Selection for waveforms
Co-Chair effort in monitoring contractors
Co-Chair effort in T&E/Certification of waveforms

Service PMs focus on SDR hardware and Antenna

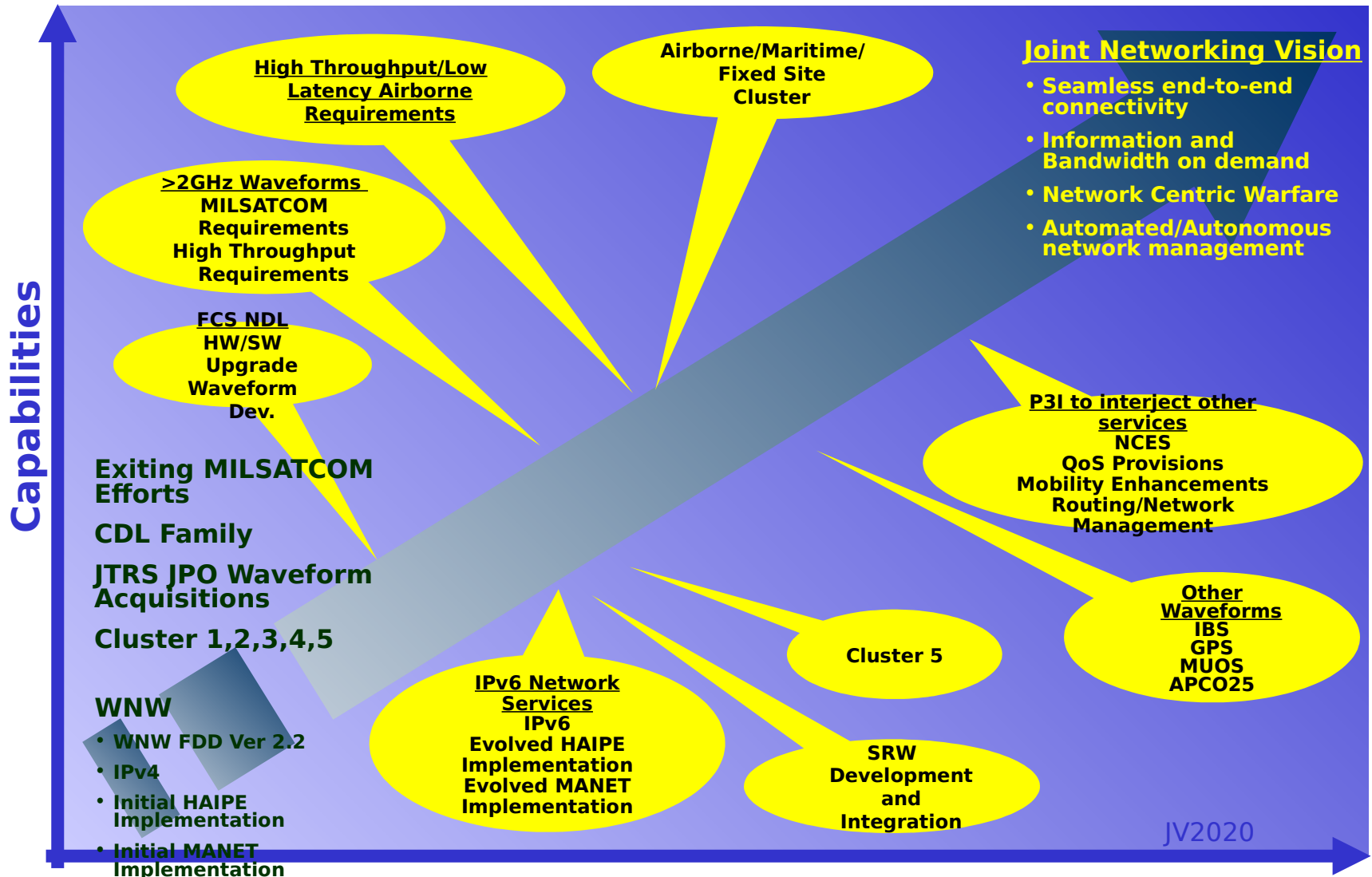


JTRS Evolution

- Initial Program
- Changing JTRS Requirements
 - Developing CONOPs
 - OSD Policy
 - Additional Requirements
 - Networking Requirements
 - Security Requirements
- Networking Architecture Strategy
 - Evolutionary Acquisition Strategy
 - IPv6
 - >2GHz
 - – Notional Timelines
 - Critical Technology

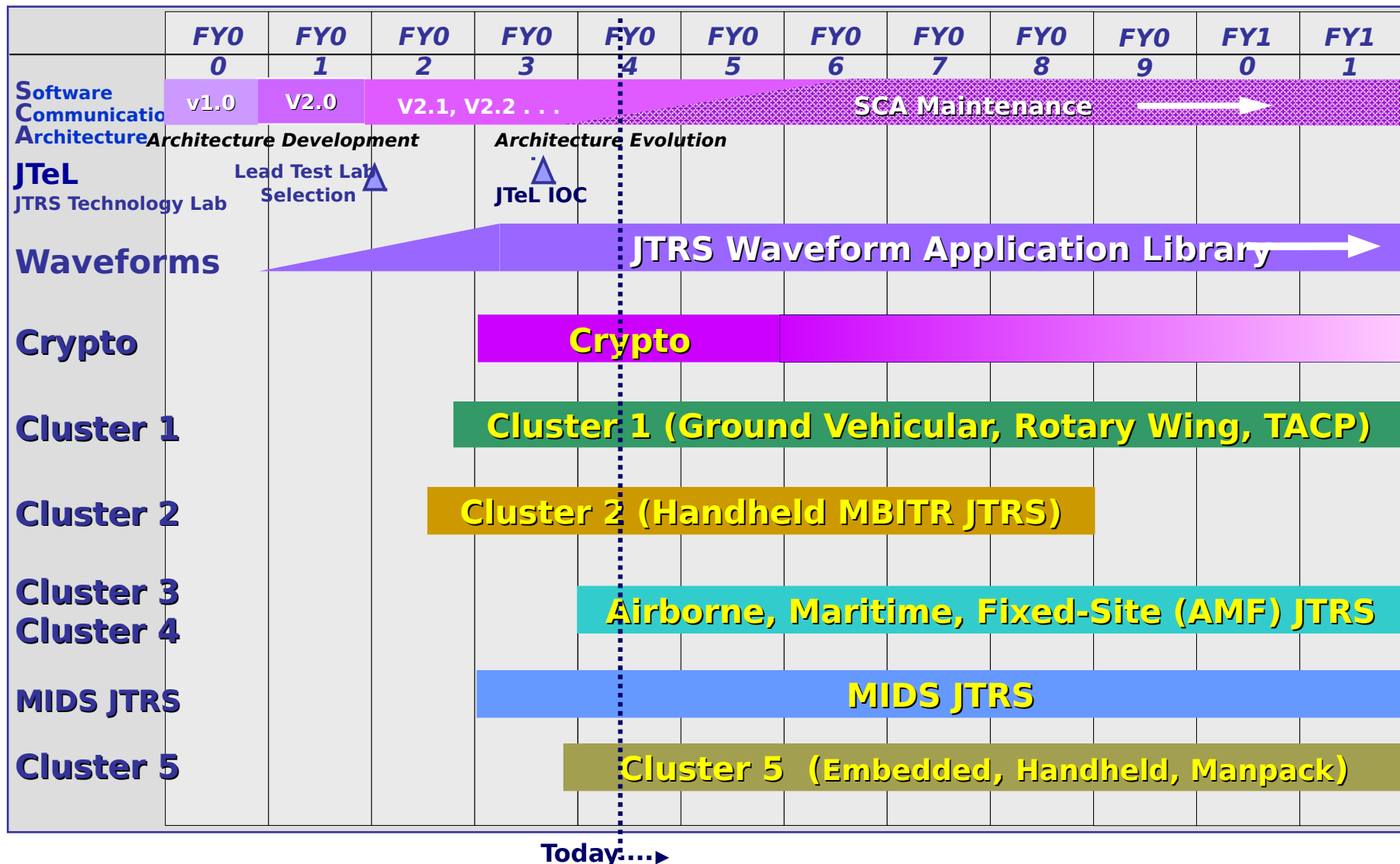


Possible Injection Points Within the Program



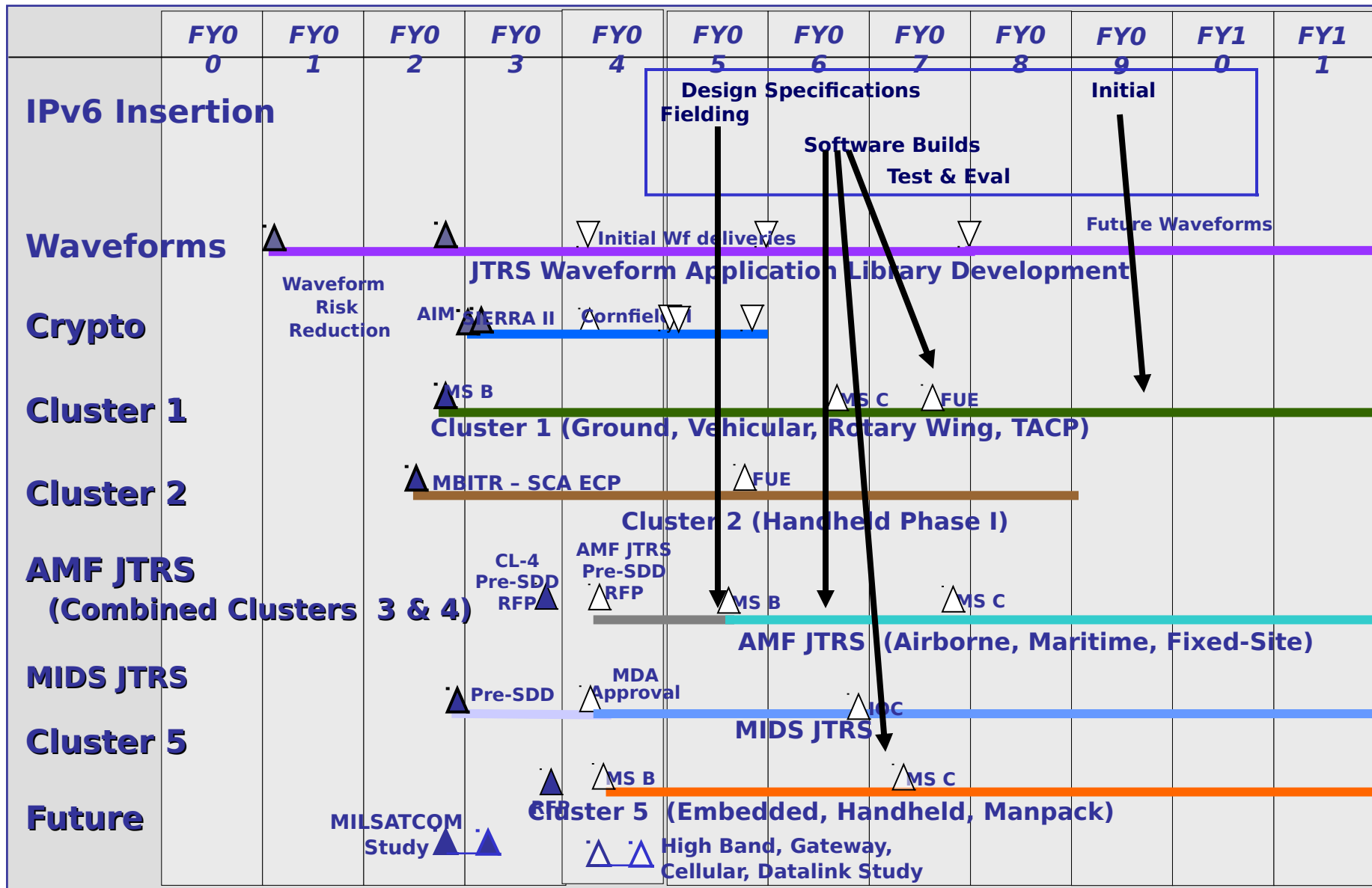


JTRS Program Schedule



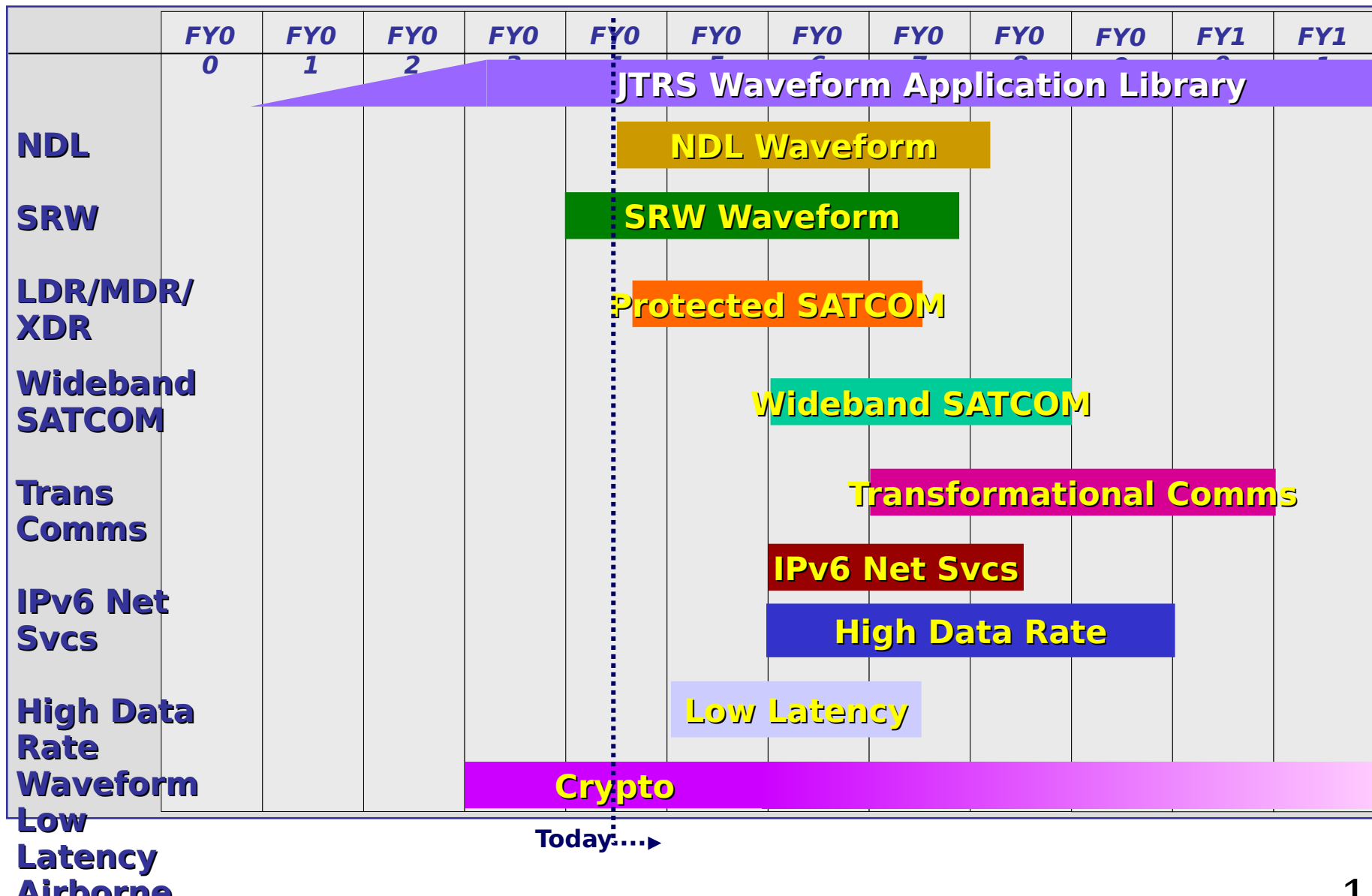


JTRS IPv6 *Notional* Acquisition Timeline





JTRS Notional Timeline





JTRS Evolution

- Initial Program
- Changing JTRS Requirements
 - Developing CONOPs
 - OSD Policy
 - Additional Requirements
 - Networking Requirements
 - Security Requirements
- Networking Architecture Strategy
 - Evolutionary Acquisition Strategy
 - IPv6
 - >2GHz
 - Notional Timelines
 - ➡ – Critical Technology



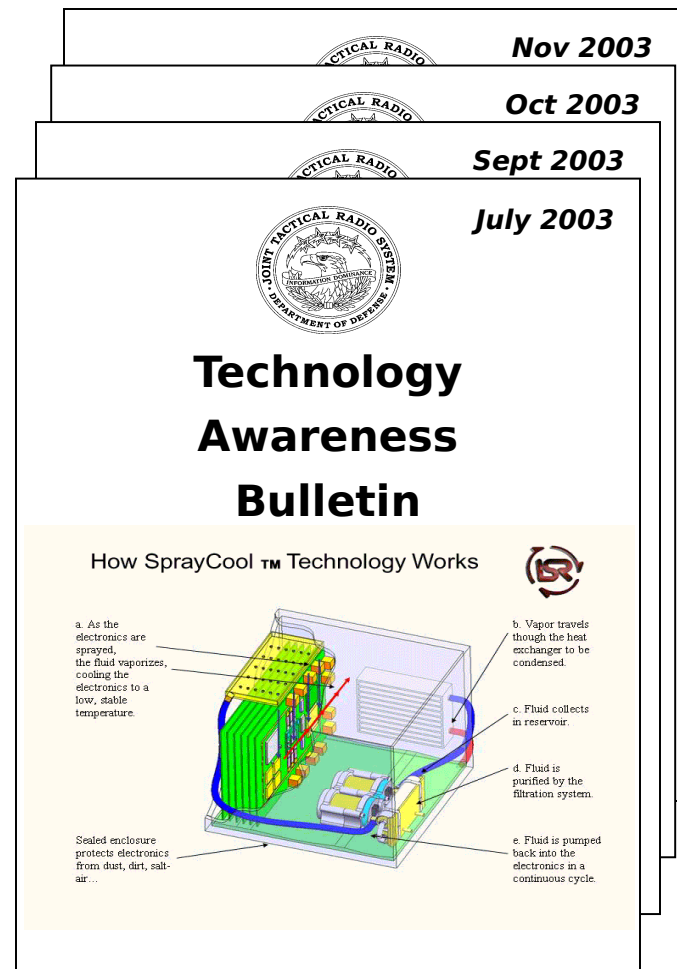
Critical Development Areas

- Software-base Communications Capabilities
 - Software Waveforms
 - Non-waveform Specific Services
- Common Networking Services
 - GIG-based End-to-End Services
 - MANET Services
 - Network Management
- Common Components and Modules
 - Common Across Different Platform Environments (Where Feasible)
 - Internal Components and Modules
 - External Components and Modules
- Migration Approach for Existing Programs and Systems
 - Leverage Existing Efforts As Appropriate to the Maximum Extent Possible/feasible
 - Address Program/system Specific Consideration As Appropriate
 - Address Joint Objectives and Goals
- Platform Specific Considerations
 - Size, Weight, and Power (SWAP)
 - Use of Common Components/modules Across Platforms
- Security
 - High Assurance Internet Protocol Encryption (HAIPE)
 - Information Assurance (IA)
 - High-data-rate Encryption



Needed Technology Development

- **Network/Spectrum management**
 - Totally automated mobile network and spectrum management using adaptive, self-forming, self-healing approaches
- **Antenna Technologies**
 - Multi-band/multimode antenna technology
 - Antenna Switching: efficient switching techniques to optimize use of all platform antennas; freedom from one-radio/one-antenna paradigm
 - Co-Site and Electromagnetic Interference Mitigation
- **Power Amplifiers**
 - Develop Same Flexibility in Power Amplifiers
 - Antenna-amplifier Arrays
- **Transceivers**
 - Advanced technology to combine transceiver channels into a multi-channel module
- **Power and Cooling**
 - Power reduction/management technologies for hand-held and other small form factor sets
 - Cooling technologies to permit high density electronic component use
- **Security/IA**
 - Multi-Level Security Architectures
 - Combination of INFOSEC and Key Management functions into a single element; advanced Cryptographic solutions to integrate these functions in a single chip
 - Methodologies and applications that will enable all aspects of IA in the mobile battlefield environment.
- **Technology-based Training**
 - Applicable across whole JTRS family
- **Processors**
 - Faster Processing for High Speed Waveforms and Cryptography



**Opportunity for Industry
to Submit New
Technology Information
for Dissemination Within
JTRS Community**



Logistics

- Embedded Training

- Current ORD 3.2, DOD Training Transformation (T2) Implementation Plan, and Other Mandates Require:
 - Exploitation of Right Mix of Live Training and Simulation to Maximize Effectiveness
 - All Training Products Be Shareable Course Object Reference Model (SCORM) Compliant and High Level Architecture Compliant
 - Common Training Modules Be Reusable Across JTRS Program
 - Training Modules Be Delivered Via Network, CD-ROM, or Web-based Means to Anyone, Anywhere, at Any Time

- Logistics

- USD (AT&L) Future Logistics Enterprise Mandates Implementation of Total Life Cycle Systems Management (TLCSM) and Performance Based Logistics (PBL) As a Program Manager Responsibility

Logistics Planning Has Design Implications



Logistics Needs

- A Common Training Method Across All Clusters Will Make JTRS a True Joint Program, Save Significant Acquisition and Development Costs, and Satisfy Every War Fighter Training Need
- Industry Partnering With Government To:
 - Assume Supply Chain Responsibilities Normally Performed by DoD Services or Agencies
 - Develop and Implement Innovative Arrangements to Achieve Operational Readiness, Just In Time (JIT) or Time Definite Delivery (TDD), Reduced Physical Footprints, All at Vastly Reduced Costs